Substitution; 9 ÷ 3 = 3

Substitution; 3 - 3 = 0

Multiplicative Identity; 24 ․ 1 = 24

Multiplicative Property of Zero; 5(0) = 0

Substitution; 24 - 8 = 16

Additive Identity; 16 + 0 = 16

**Evaluate 24** · **1 – 8 + 5(9 ÷ 3 – 3). Name the property used in each step.**

**3**. 2(3 ․ 5 ․ 1 - 14) - 4 ․

**1**. 2

For every number, *a*, *b* ≠ 0, there is exactly one number such that

If *a* = *b*, then *a* may be replaced by *b* in any expression.

**Substitution Property**

For any numbers *a*, *b*, and *c*, if *a* = *b* and *b* = *c*, then *a* = *c*.

**Transitive Property**

For any numbers *a* and *b*, if *a* = *b*, then *b* = *a*.

**Symmetric Property**

For any number *a*, *a* = *a*.

**Reflexive Property**

**Multiplicative Inverse**

**Property**

For any number *a*, *a* . 0 = 0.

**Multiplicative Property of 0**

For any number *a*, *a* . 1 = *a*.

**Multiplicative Identity**

For any number *a*, *a* + (–*a*) = 0.

**Additive Inverse**

For any number *a*, *a* + 0 = *a*.

**Additive Identity**

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**4**. 18 ․ 1 - 3 ․ 2 + 2(6 ÷ 3 - 2)

**2**. 15 ․ 1 - 9 + 2(15 ÷ 3 - 5)

**Evaluate each expression. Name the property used in each step.**

24 ․ 1 - 8 + 5(9 ÷ 3 - 3) = 24 ․ 1 - 8 + 5(3 - 3)

= 24 ․ 1 - 8 + 5(0)

= 24 - 8 + 5(0)

= 24 - 8 + 0

= 16 + 0

= 16

**Exercises**

**Example**

**Identity and Equality Properties** The identity and equality properties in the chart below can help you solve algebraic equations and evaluate mathematical expressions.

**Study Guide and Intervention**

***Properties of Numbers***

**1-3**

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**Study Guide and Intervention** *(continued)*

***Properties of Numbers***

**18**. ․ 10 ․ 16 ․

**17**. 18 ․ 8 ․ ․

**15**. ․ 7 ․ 16 ․

**14**. 32 ․ ․ ․ 10

**13**. ․ 18 ․ 25 ․

**10**. 4 + 5 + + 3

**8**. ․ 12 ․ 4 ․ 2

**7**. 3 + 4 + 2 −+ 3

For any numbers *a*, *b*, and *c*, (*a* + *b*) + *c* = *a* + (*b* + *c* ) and (*ab*)*c* = *a*(*bc*).

**Associative Properties**

For any numbers *a* and *b*, *a* + *b* = *b* + *a* and *a* ․ *b* = *b* ․ *a*.

**Commutative Properties**

**Lesson 1-3**

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Chapter 1

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**16**. 3.5 + 8 + 2.5 + 2

**12**. 2.5 + 2.4 + 2.5 + 3.6

**11**. 0.5 ․ 2.8 ․ 4

**9**. 3.5 + 2.4 + 3.6 + 4.2

**6**. 26 + 8 + 4 + 22

**5**. 12 + 20 + 10 + 5

**4**. 4 ․ 8 ․ 5 ․ 3

**2**. 16 + 8 + 22 + 12

**1**. 12 + 10 + 8 + 5

**3**. 10 ․ 7 ․ 2.5

**Exercises**

**Evaluate each expression using properties of numbers. Name the property used in each step.**

Add.

Add.

= 10 + 5

= 15

The sum is 15.

= (8.2 + 1.8) + (2.5 + 2.5) Associative Prop.

Commutative Prop.

= 8.2 + 1.8 + 2.5 + 2.5

Commutative Property

Associative Property

Multiply. Multiply.

6 ․ 2 ․ 3 ․ 5 = 6 ․ 3 ․ 2 ․ 5

= (6 ․ 3)(2 ․ 5)

= 18 ․ 10

= 180

The product is 180.

**8.2 + 2.5 + 2.5 + 1.8 using properties of**

**numbers. Name the property used in each step.**

8.2 + 2.5 + 2.5 + 1.8

**using properties of numbers. Name the**

**property used in each step.**

**Evaluate**

**Example 2**

**Evaluate 6 · 2 · 3 · 5**

**Example 1**

**Commutative and Associative Properties** The Commutative and Associative

Properties can be used to simplify expressions. The Commutative Properties state that the

order in which you add or multiply numbers does not change their sum or product. The Associative Properties state that the way you group three or more numbers when adding or multiplying does not change their sum or product.

**1-3**

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